

# Simple Machines

Use the following information when requesting grants for manipulatives used to teach basic physical science concepts in Grades 2-4.

## Need Statement

The issue in my elementary classroom is **(select an area of issue below)**.

**Issue 1:** students have low interest and engagement levels.

**Issue 2:** students are struggling with problem-solving skills.

**Issue 3:** students are not engaged in learning math and science.

**Issue 4:** students have extremely diverse abilities.

**Issue 5:** too few opportunities for creative or project-based learning.

**Issue 6:** a lack of good opportunities for students to communicate in the language of mathematics and science, both orally and in writing.

**Issue 7:** students need to learn how to work effectively in teams.

## Project Description

My solution is to engage students in a cross-curricular, hands-on learning environment using LEGO Education Simple Machines®.

The Simple Machines Set and curriculum are based on constructivism. This educational theory states that children learn best when they experience things firsthand and within a meaningful context.

The curriculum, which is aligned to national standards, engages students to become more independent learners. The 21st-century skills they will develop include problem solving, comprehension, communication, creativity, and critical thinking.

It creates a learning environment that addresses the challenges associated with **(area of issue)**.

**(Add statements as needed to show how you will address the area of issue utilizing the curriculum.)**

The use of LEGO bricks helps students overcome difficulties and persevere when a first attempt does not work. Students stay motivated to continue to try and learn rather than give up.

Through this curriculum, **(number)** students will learn how to design and create working models that represent machines or machine components used in real life.

- Build models around themes that push brainstorming.
- Analyze cause and effect.
- Make observations during testing.



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- Display and communicate data.
- Create working models.

These experiences expand a student's knowledge of simple machines and how to make them move and interact to solve problems. Additionally, these experiences will help students hone speaking and listening skills as they present their ideas and listen to the ideas of others.

The curriculum's **(number)** hours of classroom instruction include open-ended problem-solving activities that engage students.

Students will demonstrate an increased ability to comprehend and solve basic problems by applying their science, technology, engineering, and mathematics skills to address challenges they encounter. Additionally, these experiences will help students develop a better attitude toward solving problems and increase their confidence.

Skills assessment will take place through student presentations, ongoing observation, and written work.

**(Add information on current scores in mathematics, science, and so forth or other issues as it pertains to this grant to reemphasize need and the increases you hope to achieve.)**

**(Add information on the standards and types of lessons you will utilize in this program to achieve the growth indicated in the paragraph above. Be specific about the way you will implement the program so readers will understand exactly how the program will help students succeed in math.)**

## Curriculum Information

**(Select relevant description options. Be sure to include information on the area of issue. Add additional statements to show how you will address area of issue using Simple Machines.)**

### Option 1: Simple Machines Set

Students design machines that incorporate gears, pulleys, levers, and wheels and axles and explore basic physical science concepts through observation, reasoning, prediction, and critical thinking.

- 204 elements
- Full-color building instruction booklets and an element overview
- Storage bins

This program teaches students the underpinnings of physical science and prepares them for further study in robotics using LEGO Education WeDo.

### Option 2: Simple Machines Activity Pack

When used with the Simple Machines Set, this activity pack helps develop elementary students' understanding of basic physical science concepts such as gears, pulleys, levers, and wheels and axles through observation, reasoning, prediction, and critical thinking.

- 16 principle model activities
- 4 main activities
- 4 problem-solving activities
- Aligned to NSTA and NCTM standards

The CD-ROM includes teacher's notes, student worksheets, and a glossary.



## Professional Development

This workshop consists of hands-on activities, communication, reflection, and application that is tailored to meet the needs of the participants.

The workshop lets participants experience being both a student and a teacher as they learn how to apply the concepts behind simple and complex machines within science and math curricula and practice differentiated instruction.

Participating in the workshop leads to a greater understanding of how LEGO Education creates an environment where all students can share their ideas and knowledge. It also provides the tools necessary to engage students throughout the year by connecting the possibilities of the Simple Machines Set and lessons with the required curriculum.

## Learning theory

- Apply the 4Cs in the classroom.
- Awaken students' interests in given subjects.

## Hands-on

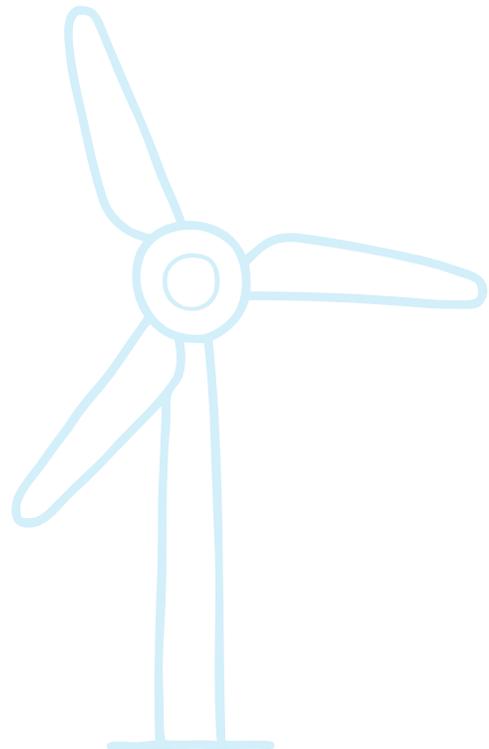
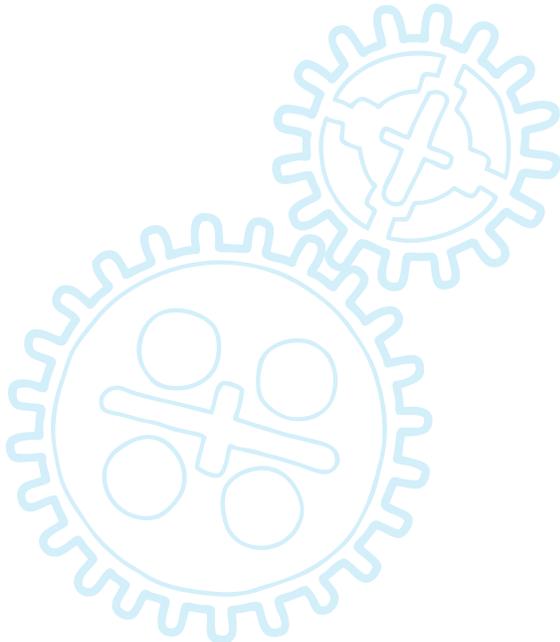
- Build machines and see how they can teach specific concepts to gain confidence in the classroom.
- Learn how to begin and how to take a simple concept and make it complex through a series of intermediate steps.

## Tools for planning

- Explore ways to apply the Simple Machines Set and lessons to curricula.
- Share ideas with other participants and leverage best practices to get the most from professional development.

## Materials management

- Organize and label the materials and do periodic inventory.
- Keep the sets organized and ready for student use.



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